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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

A SCIENCE SERVICE PUBLICATION

GEOPHYSICS

Forerunners of Satellites

➤ SIX GOLD-PLATED MAGNESIUM spheres, forerunners of the actual satellites to be launched during the International Geophysical Year, have been received by the Naval Research Laboratory.

Final outer coatings of the spheres are now being applied at the Research and Development Laboratories of the Army Corps of Engineers at Fort Belvoir, Va. The shiny globes, 20 inches in diameter with a skin .032 of an inch thick, were built by Brooks and Perkins, Inc., Detroit, under Navy contract.

Four coatings go over the gold-plating: an adhesive layer of chromium, a separating layer of silicon monoxide, next a layer of highly reflecting aluminum, and a thick, final layer of silicon monoxide. The outer coat is to absorb infrared rays and emit heat, thus protecting the aluminum.

The coating is done in vacuum vats in which the vaporized coating material is deposited on the spheres by condensation. The finished globes will be given a mirror polish.

When the satellite gets into its orbit, it will be about as visible optically as a shiny golf ball traveling at the speed of sound at 60,000 feet, the Naval Research Laboratory reports. Therefore, scientists will try to track it initially by radio, using a small 10 to 50 milliwatt transmitter called the Minitrack.

In case the radio fails, however, teams of volunteer observers will attempt to spot it with especially-designed optical equipment.

To detect the weak radio signal, only a millionth as strong as a standard radio broadcast, special receivers are being built. One of these is now in operation at NRL's satellite tracking station, Blossom Point, Md. Eleven more are being built by Bendix Aviation Corporation.

The position of the earth-circling satellite will be computed by measuring the minute differences in time required for the radio signal to reach each one of several ground antennas, spaced as much as 500 feet apart.

A computer to determine the exact moment when the third stage of the launching vehicle will be fired, injecting the satellite into its orbit, has been completed and tested by Air Associates, Inc., under a subcontract with the Glenn L. Martin Company. It is known as a "coasting time computer," the Office of Naval Research reports in *Research Reviews* (March).

The first stage of the three-stage rocket that will fire the satellite into space will use a special grade of kerosene called Shell UMF Grade B as fuel. It is produced by Shell Oil Company through close control of refining operations to obtain the particular characteristics needed for rocket fuel.

Science News Letter, April 13, 1957

BIOPHYSICS

Check 40-Year-Old Food

➤ CANNED FOODS that were packed in sawdust and left in Antarctica more than 40 years ago will be brought back and checked for radioactivity, John L. Harvey, deputy commissioner, U. S. Food and Drug Administration (FDA) in Washington reported.

The preserved food will be used to complete the FDA collection of authentic samples of canned foods packed before 1945, the "year one" of the atomic age. They will provide the base measurements in a study of radioactivity of common foods which the FDA has started and will continue.

There is no significant radioactivity in this country's food supply today, Mr. Harvey pointed out.

"This is only a scientific study which will help us to evaluate any future increase in radioactivity, should that become necessary," he said.

Samples of the foods will be obtained from their "refrigerators" at two camp sites in Antarctica. One is at Cape Royds, built and occupied by the British Antarctic Expedition in 1908-9 under Sir Ernest Shackleton. The other camp site is at Cape Evans, established by Capt. Robert Falcon Scott, Royal Navy, during his expedition from 1910 to 1913.

Large stores of foods remain at both camps and most of them appear to be in perfect condition, Capt. Richard Black, USNR, who visited the sites in 1956, reported.

The food is being made available by the cooperation of the U. S. Antarctic Programs and the British and New Zealand governments.

Science News Letter, April 13, 1957

ENGINEERING

Management Has Trouble As Engineering Grows

➤ THE ENGINEERING PROFESSION has grown tremendously since World War II, but it has not done so without trouble between engineers and the management of the companies they work for, Hugh L. Rusch, Opinion Research Corporation, Princeton, N. J., told the American Institute of Chemical Engineers meeting in White Sulphur Springs, W. Va.

Interviews with engineers across the nation have shown that engineers give a favorable "over-all" verdict on their companies, but they are critical on several crucial points, Mr. Rusch reported.

They give the following complaints most frequently and spontaneously when discussing their relations with company management, he said.

Seventy-seven percent say "Engineers are given too much routine work." Seventy-six percent say "Pay is not high enough compared with other positions requiring th same or less ability." Sixty-one percent say "Engineers are not kept properly informed of company policy."

In another part of the general survey, the majority of engineers showed a strong aversion to forming unions for collective bargaining. This sentiment against unions varied widely from company to company, though, indicating that management's handling of a particular engineer can be a very important factor in his thinking about unions, Mr. Rusch said.

Two things are needed if engineers and management are to make the most of their relationship, he concluded.

"Management must understand what the engineer expects, and know that his expectations are high. But the enginer must also learn to view his own job as management is forced to see it, in the light of the complex requirements of the entire business, which must prosper as an organization if its various members—engineers included—are themselves to grow in stature, be prosperous, and be happy in their work."

Science News Letter, April 13, 1957

BIOCHEMISTRY

Need Vitamins to Make Antibodies to Fight Ills

➤ VITAMINS are vitally needed by the body if it is to develop antibodies for fighting infection, Dr. A. E. Axelrod, professor of biochemistry, University of Pittsburgh, Pittsburgh, Pa., told the National Vitamin Foundation meeting in New York.

Animal experiments with diphtheria toxoid, used in man to produce immunity against diphtheria, show that an adequate supply of vitamins must be present in the body at the time the toxoid is injected if a satisfactory number of antibodies are to be produced by either the first injection or by future "booster" injections, he reported.

This booster reaction is applied in the vaccination schedule of three injections used with the Salk vaccine for polio.

Rats who received diets lacking in some of the B-complex vitamins were unable to produce antibodies after a single dose of the diphtheria toxoid. Similar results were found in rats fed on a diet lacking in tryptophane, an amino acid found in protein, Dr. Axelrod reported.

The secondary or booster response was also inhibited in rats lacking the vitamins. Neither vitamin supplements nor stimulation by the toxoid in this secondary stage could help antibody response.

Science News Letter, April 13, 1957

EDUCATION

Typical Teacher Married, Well Qualified for Job

➤ CONTRARY TO POPULAR opinion, the typical American teacher is not a pretty young girl fresh out of high school.

Most teachers are married. Most are well-qualified for the job. And most are themselves parents of children. More than half of all teachers are women teaching in the elementary grades.

These facts were revealed by a comprehensive survey conducted by the National Education Association.

The typical woman teacher, it was revealed, is older than the typical man teacher —45.5 years against 35.4. The woman teacher is also more experienced in teaching—15.4 years against eight years for the man teacher.

The typical man teacher, however, teaches in high school or in junior high and has 129.1 pupils in his classes. The typical woman teacher is in an elementary grade and has 30.8 pupils in her class. The man teacher's salary is $4,374 while the woman gets $3,932.

The typical teacher of both sexes is a college graduate with a bachelor's degree. A higher degree is held by 42% of the men and 18.1% of the women. More teachers have higher degrees than lack any degree.

The typical teacher is also an active member in a church and belongs to at least one or two community organizations. About 85% voted in the most recent election.

Science News Letter, April 13, 1957

RADIO ASTRONOMY

Exploding Star Is Giant Atom Smasher

➤ AN EXPLODING STAR that suddenly became extremely brilliant on July 4, 1054, A.D., is now known to be an atom smasher in the sky so huge it dwarfs the entire solar system.

Debris from this heavenly cataclysm is called the Crab Nebula. It is visible through a telescope as a faintly glowing cloud of gas. Astronomers at Mt. Wilson and Palomar Observatories in California have found that light from this former supernova is nearly 100% polarized.

This indicates a very strong magnetic field and large quantities of very fast-moving electrons. Acceleration of electrons may also be responsible for the radio waves broadcast by the Crab Nebula, Drs. B. F. Burke and M. A. Tuve, director, Carnegie Institution's Department of Terrestrial Magnetism in Washington, suggest.

All sources of radio noise so far identified with visible objects in the sky appear to be composed of highly turbulent and ionized gases, they report to the Smithsonian Institution. Other requirements may exist, they say, which will influence theories of how an agitated gas emits radio waves.

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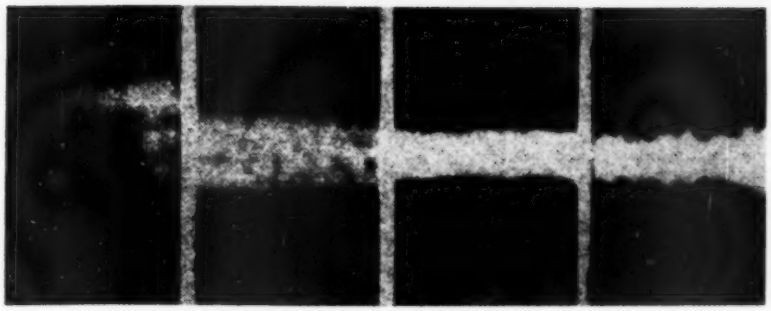

RUSSIAN'S "PINCH EFFECT"—Successive photographs at intervals of 0.5 microseconds taken from a moving picture of a pulsed discharge in heavy hydrogen. They show the first contraction, or "pinch."

PHYSICS

The AEC's Paper Curtain

Most U. S. research on the possibility of controlling thermonuclear reactions to produce peaceful power is hidden behind the Atomic Energy Commission's secrecy regulations.

➤ A PAPER CURTAIN still hides most of the progress being made by the United States in harnessing the fiery heat of hydrogen-bomb reactions for peaceful power.

A slight tear in the curtain occurred when the Atomic Energy Commission announced plans to build a "Model C Stellarator," a large device for research in controlled thermonuclear reactions. However, as an iceberg is seven-eighths hidden under water, so the largest part of present work is hidden behind secrecy regulations.

Judging from the information so far released, considerable progress is being made in the five laboratories involved in Project Sherwood, the AEC's name for its controlled thermonuclear program. It seems to be only a matter of time, brains and many dollars to wrest power from fusion reactions.

The amount of money devoted to research on harnessed fusion in the current fiscal year ending this June 30 is more than 20 times the amount spent in 1953, Rear Admiral Lewis L. Strauss, AEC chairman, reported. From 20 scientists and engineers studying the problem in 1953, the figure has

EARLY U. S. "PINCH EFFECT"—This photograph shows the "pinch" going around a curve in xenon gas in an early Perhapsatron torus, which is a doughnut-shaped apparatus, the Atomic Energy Commission explains.

jumped to 250 this year, with another 250 as supporting personnel.

These figures, however, do not include the many people not on the AEC's payroll who are contributing ideas, time and research effort. Achieving power from fusion would solve the problem of mankind's expanding need for energy sources and is a dream that has captured the imagination of many scientists.

Among the several light elements that could be used as fuel, the deuterium in the world's oceans alone would sustain an energy production rate 1,000 times the world's present capacity for more than a billion years.

The facts revealed (April 1) by the AEC concerning Project Sherwood do not yet match those given out (April, 1956) by the Russians, who have said they have reached temperatures of about one million degrees in their laboratory experiments.

In answer to a question concerning what temperatures the U. S. had reached, Adm. Strauss said, "I think one might say that very high temperatures have been achieved, but not high enough."

As to the British, he said, the U. S. was sometimes ahead in the race to be the first to tame fusion reactions, then a few weeks or month later would lag behind the British. He stated that judging the final winner would be like predicting the winner of a race when entrants had not yet reached the quarter mark.

The problem of achieving a controlled thermonuclear reaction is one of heating and confinement. It is necessary to heat a suitable nuclear fuel to temperatures of a hundred million degrees, then confine it at that temperature long enough for fusion to take place. The energy resulting must be larger than the losses to be harnessed for useful power.

One of the most promising methods of doing this is to make use of the so-called "pinch effect," the contraction of an electric current due to a magnetic field. This shrinking occurs in any liquid or gas carrying a current, such as the familiar neon tube, but is usually much too small to be noticeable.

When large enough currents are used, however, the current will pull itself into a thin thread, shrinking from the walls until the thinning column is its own container. So far scientists have been able to maintain the pinch effect for only a few millionths of a second before it becomes unstable and breaks down.

The AEC's first device for studying the pinch effect, operated at the Los Alamos Scientific Laboratory, was known as the "Perhapsatron." In it, and its successor, the Columbus, xenon and krypton were used to examine in detail the increased density and temperature under the maximum compression in the pinch.

Decision to build at Princeton, N. J., the Model C Stellarator, a coined word from stellar and generator, is the biggest forward step yet taken to control fusion reactions.

The program is under the direction of Dr. Lyman Spitzer Jr., director of the Princeton University Observatory, with general supervision by a committee headed by Dr. H. D. Smyth, former AEC commissioner who wrote the Smyth report, a factual account of the development of the atomic bomb.

Many scientists and such organizations as the Federation of American Scientists have called for the equivalent of a Smyth report on the taming of hydrogen-bomb reactions. They believe progress in the U. S. would be much faster if most or all of the studies made so far were given the widest possible circulation among scientists, thus greatly spurring interest in the problem.

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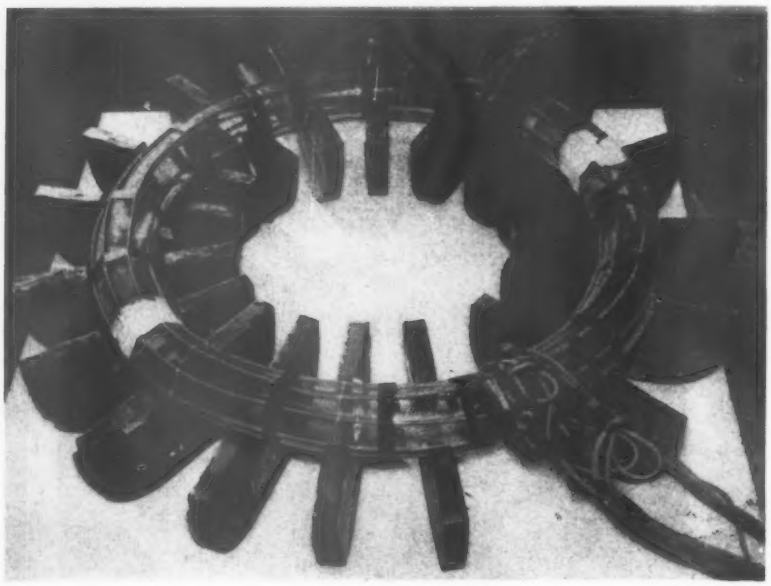

PERHAPSATRON TUBE—Primary windings and iron cores of the magnets used to heat gases for studies of the "pinch effect" are shown going around the Perhapsatron discharge tube, developed at Los Alamos Scientific Laboratory. Aim of the studies is to investigate the feasibility of controlling fusion reactions for peaceful purposes.

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METEOROLOGY

"Poison" Cloud's Nuclei To Prevent Hail Storms

➤ "POISONING" the particles in clouds around which hail forms was suggested as a more promising method of hail prevention than cloud seeding at the American Meteorological Society meeting in Chicago.

The "poisoning" would not be arsenic or some other such lethal compound, but some chemical that would hinder nature's process of producing hail.

Cloud seeding may actually increase, rather than decrease as it is supposed to do, the amount of hail formed in storm clouds, Dr. Helmut Weickmann of the Signal Corps Engineering Laboratory, Belmar, N. J., charged. He said this is because more water is stored in the hailstorm clouds than is released during the storm, so adding more particles around which hail can form could enhance hail formation.

Dr. Weickmann believes it should be possible to prevent hail by "poisoning" the freezing nuclei already present, thus robbing them of their ability to be the hailstone's center. A chemical that would change the particle's crystal structure, for instance, might do the job. Ammonia is one chemical known to have an effect on freezing nuclei.

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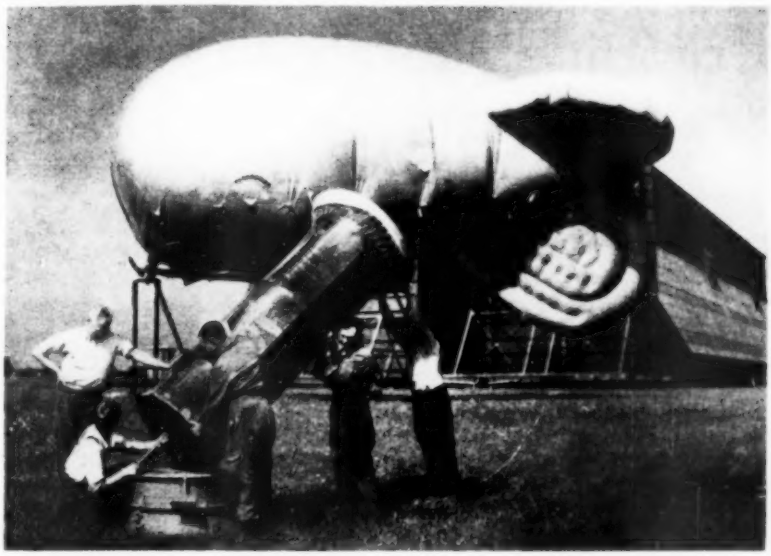

BAGGING INSECTS—Agricultural experts in Hertfordshire, England, are shown here engaged in pest control experiments. They are preparing an insect trap for another flight suspended from the balloon which will be sent into the upper atmosphere. Scientists hope to learn how weather conditions affect the distribution and numbers of insects.

BIOLOGY

Heredity and Cancer

➤ ALL CANCERS are caused by the same biological mechanism — the breakdown in the body's ability to maintain an even balance or equilibrium.

The breakdown most probably occurs during the aging process in which the body is gradually weakened, the equilibrium upset and an organ of the body suddenly goes wild in growth.

These are some of the findings of Dr. Leonell C. Strong, director of the biological station of the Roswell Park Memorial Institute, Springville, N. Y., based on his 40-year genetic study of mice.

"I have found evidence that indicates there is a strong organic relationship between different kinds of cancers," Dr. Strong reports. "This is being neglected today and researchers are calling one cancer different from another cancer."

Dr. Strong makes it quite clear his studies with mice can only apply to cancer problems in humans in that there are fundamental principles governing the cause of cancer in all mammals.

Studies in which chemically-induced cancers are transplanted in mice have shown, Dr. Strong explains in *Science* (March 29), that a mechanism actually exists that keeps both the species and individuals of the species in equilibrium. If this were not the case, he reported, it would be relatively easy for a species to drift into a state of chaos.

In mice bred with transplanted cancers, for example, reproduction is slowed down or speeded up to adjust to the normal cycle.

In this case, litters are later than normal or earlier than normal; smaller or larger in numbers; or produced by the mother mouse at an earlier or later age.

This equilibrium, Dr. Strong believes, is maintained until the aging process causes a breakdown that results in an organ of the animal becoming cancerous.

Different families of humans, Dr. Strong reports, age differently. Some suffer a metabolic breakdown earlier than another kind of breakdown. Others suffer a neurological breakdown first, and so on. When the breakdown occurs, it gives a part of the body a chance to go wild.

Where children develop cancer, Dr. Strong states, it is an example of precocious aging.

On the other hand, some families maintain an equilibrium throughout the aging process and members live to 100 years or more.

Another finding of the study revealed a case of reversed susceptibility. Dr. Strong notes he "should have quit when he was half done."

He had bred mice that were resistant to induced cancers. He then re-bred them and finally, after seven generations, produced a strain of mice that was immune to transplanted cancers. But, the eighth and following generations "reversed" the trend and became more susceptible to the cancers than the original parents of the strain.

Dr. Strong is now trying to find out why this happened and what relationship it has to inbreeding.

"The primary aim of the entire study," Dr. Strong concludes, "is to find a prevention for cancer based on the rational mechanism responsible for it."

"I firmly believe a prevention will be found before a cure for cancer will be found."

Science News Letter, April 13, 1957

TECHNOLOGY

Eight Cameras Score Guided Missile Hits

➤ A MISSILE-SCORING SYSTEM using eight cameras, four in each wing-tip pod, to give full sky coverage for determining how and why a guided missile hits or misses its target has been developed for the U. S. Navy.

Since guided missiles and their drone targets fly close to the speed of sound, a reliable method for evaluating each test can best be obtained photographically from the target. The scoring system gives this information on 16mm motion picture film. The cameras, designed and manufactured by Bell & Howell, Chicago, have a 200-foot film capacity, sufficient to cover as many as four missile tests without reloading.

A pair of pods, one for each wing tip, cost $23,800, Charles H. Percy, Bell & Howell president, said, but this price will drop as production continues.

Science News Letter, April 13, 1957

CHEMISTRY

Combine Metals and Vinyl

➤STUDIES UNDERWAY in the field of organo-metallic compounds, some of which have become popularly known as "exotic materials," show promise of chemical developments which could have major implications in basic chemical research, plastics, silicones and perhaps even in guided missile fuels.

Two Harvard University research workers, Drs. Dietmar Seyferth and F.G.A. Stone of Harvard's Mallinckrodt Chemical Laboratory, have begun a study of vinyl derivatives of metals, starting with a substitution of tin in vinyl compounds. They hope to expand their study to cover substitutions of other metals and metalloids.

A group of new compounds which they say "may possibly display interesting physical and chemical properties" could result from this study.

Drs. Seyferth and Stone became interested in these new possibilities following their earlier studies of organo-metallic compounds and studies of the vinyl chemistry of boron and silicon.

The new studies compare roughly with work that resulted in development of silicones now widely used in materials ranging from low-temperature aircraft lubricants to eyeglass cleaners and high-temperature electrical insulation.

To the chemist, a vinyl compound is one containing a radical or group of two carbon and three hydrogen atoms per molecule, arranged in a characteristic order (CH_2:$CH-$), which can be added to or taken from molecules of other materials, greatly changing the physical and chemical behavior of the materials.

A molecule of ordinary acetylene used for welding can add a molecule of hydrogen chloride, the gas that produces hydrochloric acid in water, to form vinyl chloride, an entirely different substance used as an intermediate in making many plastics.

The organic vinyl group appears in a variety of industrial and household products, including the vinyl plastics Vinylite and Teflon.

Inorganic silicon, in an oxide form, is the major constituent of ordinary sand. Because of chemical similarities which are clearly demonstrated in Group IV of the periodic table of elements, silicon has been substituted for carbon in producing silicones.

A comparable substitution of the element boron has resulted in the so-called "exotic fuels" for guided missiles.

The first few of the possible new group of compounds prepared have been named vinyltin compounds. The new compounds developed so far are solids at normal room temperature, most with melting points somewhat above room temperature and boiling points considerably above the boiling point of water at normal pressures.

In addition to expanding their study to substitutions of metals other than tin, Drs. Seyferth and Stone plan to report shortly on substitutions of hydrogen compounds, metal salts, and halogens such as chlorine, iodine, etc. They also plan to study polymerization of these compounds. Polymerization of usual organic compounds occurs when organic molecules of the same kind attach themselves to each other to form long-chain molecules, many of which are used as plastics.

The work is supported by the U. S. Office of Naval Research. The research is being reported in a series beginning in the *Journal of the American Chemical Society* (Feb. 5).

Science News Letter, April 13, 1957

MINING

Oil and Coal Chemicals

➤ THE FUTURE burns bright for the coal and oil industries, the American Institute of Mining, Metallurgical and Petroleum Engineers meeting learned in New Orleans, La.

The booming population and its attendant industrial development will help the bituminous coal industry off its present deathbed, Hubert E. Risser, professor of mining engineering at the University of Kansas, said.

"Coal's future," he declared, "never looked brighter."

The use of coal in the direct manufacture of chemicals holds the greatest potential for this fossil fuel, he reported. Nuclear energy, on the other hand, will not have a significant impact on the coal industry for at least a score of years.

Improved techniques and additional discoveries in old and new areas will result in oil production that will surpass recent estimates in the United States. This was the prediction of Dr. Richard J. Gonzales, director and treasurer of Humble Oil & Refining Co., Houston, Tex.

Even the 300 billion barrels estimated by the U. S. Department of Interior to be the nation's total reserve may be "conservative" in 20 years, Dr. Gonzales said. He cautioned, however, that the amount of oil found and produced in the United States will depend on "national policies on imports and on taxation of domestic production."

Dr. Gonzales pointed out that "as more oil is discovered, the estimate of ultimate production in the United States will continue to be pushed upward and the predicted date of running out of oil will be pushed farther into the future."

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● RADIO

Saturday, April 20, 1957, 1:45-2:00 p.m., EST.

"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS station.

Dr. Samuel L. Emsweller, chief of the ornamental plants branch, U. S. Department of Agriculture, will discuss "Easter Lilies."

BACTERIOLOGY

Bacteria Produce Acid That Resists Viruses

➤ A NEW ACID produced by bacteria to make them resistant to virus infections has been discovered by Drs. Walther F. Goebel and Guy T. Barry of the Rockefeller Institute, New York.

Called colominic acid, the substance was produced by *Escherichia coli*, a type of bacteria found in the human intestinal tract.

This is the first time that an acid of this type has been found in bacterial cells, and its importance lies in the fact that the bacteria manufacturing it are resistant to infection by several bacterial viruses, the scientists reported.

An understanding of the biochemistry of the process may eventually throw light on what makes some cells resist virus infection while others do not.

What makes the new-found acid unusual is that it contains large quantities of a substance that resembles sialic acid.

Sialic acid has interested scientists in recent years because of its effect on viruses. When it is combined in its native state with protein and other sugars, the sialic acid-containing complex interferes with the adherence of certain viruses, such as the influenza virus, to living cells.

Before now, the only known source of this sialic acid and its close relatives has been from protein materials found in certain animal tissue.

Science News Letter, April 13, 1957

PUBLIC HEALTH

Start Nationwide Study Of Brain Strokes

➤ THE FIRST NATIONWIDE research attack against cerebral vascular disease, more commonly referred to as "stroke," was announced by Dr. Leroy E. Burney, Surgeon General of the U. S. Public Health Service.

Stroke is the nation's third-ranking killer and accounts for an estimated 175,000 deaths annually.

The program is expected to run five or six years and include 35 to 40 research institutions. It is under the auspices of the National Institute of Neurological Diseases and Blindness, National Institutes of Health, Bethesda, Md. Research results are expected to shed new light on the causes of strokes and uncover more effective treatment methods.

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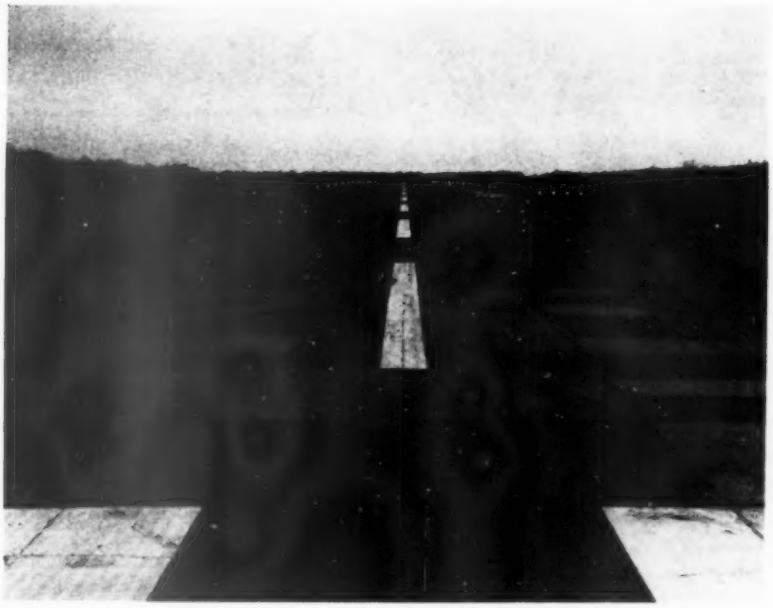

ELIMINATING "BLACK PIT"—Special boxes which contain experimental lighting elements are shown in this daylight photograph at Andrews Air Force Base. The lights are being tested in a program to provide for safe night landings.

METEOROLOGY

Tornado-Proof Houses

➤ HOUSES can be made virtually "tornado-proof" for only a few hundred dollars extra, George W. Reynolds of the University of Michigan believes.

Three shortcomings—improper anchorage, insufficient internal bracing or lack of proper air vents—account for the great majority of structures destroyed in tornadoes, he told the American Meteorological Society meeting at the University of Chicago.

Mr. Reynolds believes houses can be built to survive all except the most severe such storms at a cost increase of from $50 to $350. Properly built structures, he said, might eliminate as much as 90% of deaths and injuries resulting when the tornado's swirling funnel strikes.

Improper anchorage of a house to its foundation or of a roof to the building can result in the house being tipped over or the roof being peeled off, Mr. Reynolds said.

Sudden lowering of air pressure, caused by winds sweeping around the structure or found in the tornado's center, can cause buildings to "explode." To remedy this, Mr. Reynolds suggests inexpensive ties to hold each wall securely to its neighbors and simple air vents in attics and basements to equalize the pressure inside and outside a house.

Fireplaces, open windows and attic fans all provide a means for the air to escape. Although these might be enough, Mr. Reynolds gave as a rough estimate an air escape area of one or two square feet for each 1,000 square feet of floor space, including the basement and attic. This much venting, he said, "might be enough to keep houses from exploding during all but the worst part of the most severe tornadoes."

Mr. Reynolds said he doubted that tornado winds are as strong or the drop in air pressure as great as generally believed. Although the highest wind speeds in a few tornadoes may reach up to 300 miles an hour, he thinks the maximum speeds in most tornadoes are between 100 and 200 miles an hour.

The pressure on the inside of most tornadoes, his studies showed, appears to be about 75% of that on the outside and is usually probably closer to 90% or 95%. Even this, he said, is enough to cause the air on the inside to push on the wall harder than the outside air is pushing in by about 100 to 200 pounds per square foot of wall space, if none of the air inside the house escapes.

Mr. Reynolds came to his conclusions after touring the scenes of nine tornadoes and reading many technical reports.

Science News Letter, April 13, 1957

AERONAUTICS

Lighting Research for Safe Night Landings

➤ THREE AIRPLANE RUNWAYS, ablaze with experimental lights, are being tested at Andrews Air Force Base, Camp Springs, Md., to make night landings safer, the Civil Aeronautics Administration reported.

The lights are designed to eliminate the "black pit," that area of the runway between the two rows of lights now being used to show the way for pilots.

Each of the three experimental systems had to employ lights flush with the runway when used on the runway, and of minimum height just off the runway. Otherwise, CAA researchers pointed out, the lights would be a hazard for airplane wheels and wings.

In one system, bars of lights 30 feet to either side of the runway centerline, have been put in especially constructed boxes designed to allow the approaching pilot to see a point of light from each.

In a second system, similar to the first, the light-bars have been placed 45 feet from the centerline.

These two systems give a "narrow gauge" and a "wide gauge" runway for the CAA tests.

The third system tries to make markings on the center portion of the runway show up by means of reflected light.

Pilots of all types of planes, from small twin-engine craft to jets, are invited to fly the systems and make comments on them, the CAA said.

Science News Letter, April 13, 1957

PSYCHIATRY

Backward Child Should Be Helped at Early Age

➤ PROPER ATTENTION to mentally retarded children and their parents when the children are of nursery school age might alleviate difficulties in later life and reduce the population of institutions for the mentally defective.

This conclusion, made as a result of study of a group of retarded pre-school children, was reported to the American Orthopsychiatric Association meeting in Chicago by Drs. Katherine F. Woodward, Miriam G. Siegal and Marjorie J. Eustis, of the pediatric psychiatry service of Lenox Hill Hospital, New York City.

Parents of the children studied by the New York doctors were all of average intelligence or better. The fathers were professional men or white collar workers.

Work with the parents proved to be of major importance in helping the children, the psychiatrists reported. Psychological factors in the parents' make-up and relationship seemed to contribute to the backwardness of the children.

Parents and children should receive help very early, as soon as there is any suspicion that the child is retarded, the scientists warn.

Science News Letter, April 13, 1957

HORTICULTURE

"Mound Gardening" Increases in Favor

➤ A NEW LANDSCAPING TECHNIQUE called "mound gardening" is finding increased favor with homeowners.

According to Dr. V. T. Stoutemyer, ornamental horticultural expert at the University of California at Los Angeles, it might be described as "a 20th century version of the medieval moat to protect modern man's castles from the fiery dragons of the Machine Age."

It consists of vegetation-carpeted mounds which replace traditional lawns—serving not only an aesthetic function but reducing exhaust fumes and traffic noise from busy thoroughfares.

Mound gardening's increasing popularity and use of other landscaping techniques that break up areas so that machine maintenance is not practical, has created a great demand for ground covers, he says. So has the trend toward building on rough and hilly terrain that has resulted from increasing land values and population pressure.

Ground covers, which are replacing turfgrasses in much landscaping, include such plants as dichondra, ice plant, native California strawberries, hedges and certain low-growing shrubs.

These plants should be used primarily where turfgrasses are not practical, Dr. Stoutemyer believes. Their maintenance costs are not infrequently higher than those of turfgrasses, he says.

Science News Letter, April 13, 1957

GENERAL SCIENCE

Streptomycin Discoverer Hits Science Isolation

➤ THE COLD WAR is interfering with the war against disease, the discoverer of streptomycin and director of the Institute of Microbiology at Rutgers University, Dr. Selman A. Waksman, charges.

Citing a case of needless duplication in isolating an antibiotic by American and Russian scientists working independently, the Nobel laureate said that closer collaboration was urgently needed to rid medical science of repetitious research and unjustified creation of "new species" of antibiotic-producing organisms and new antibiotics themselves.

Dr. Waksman also urged the creation of an International Antibiotics Board to act as the clearinghouse for all antibiotic research conducted in the world.

In 1946, Dr. Waksman said, a new antibiotic called grisein was isolated in the Rutgers University laboratory. Five years later, Russian scientists announced the discovery of an antibiotic they called "albomycin." Experimental evidence gathered since has shown the two antibiotics are "chemically very similar and identical with respect to antimicrobial activity."

There had been no communication between the American group and the Russian scientists on their independent research or findings, Dr. Waksman said.

This leads once more, Dr. Waksman notes in *Science* (March 29), "to a sad reflection of the penalty that must be paid for scientific isolationism, which may even be colored by scientific nationalism."

Dr. Waksman also pointed to the fact that recently four different laboratories in the United States and Western Europe all isolated the same preparation.

"If ever isolationism has been dangerous in any field of science, if ever rapid development in such a field has required close international collaboration among different scientific groups," Dr. Waksman said, "it has been particularly true of the study of antibiotics."

In the same issue of *Science* Edward O. Stapley and Robert E. Ormond, Merck & Co., Rahway, N. J., report their experiments with the two antibiotics, grisein and "albomycin." They found them "very similar."

Science News Letter, April 13, 1957

BIOPHYSICS

Atomic Radiation May Save Churches and Grain

➤ ATOMIC RADIATION can be used to kill or control wood-boring insects as well as insects infesting grain, two independent studies reported in *Nature* (March 30) show.

Gamma rays from cobalt-60 were found to be effective in killing the eggs of both the death-watch and furniture beetles if applied within one to four days after the eggs were laid. Higher dosages are needed for more mature eggs. Tests have also shown that irradiating both sexes of the adult beetles, as well as those of the powder-post beetle, results in the production of infertile eggs.

The death-watch beetle is of particular importance to the British because it is currently devouring the ancient timbers of Westminster Abbey, St. Paul's Cathedral, Nelson's flagship "Victory," and hundreds of old churches.

J. D. Bletchly and Ronald C. Fisher of the Forest Products Research Laboratory, Aylesbury, who conducted the tests, caution that the death-watch beetle adults remain in timber for several months before emerging "and this may be an important practical consideration" in irradiating infested timber."

Gamma rays from cobalt-60 and accelerated electrons from a Van de Graaff generator, can be used to kill or sterilize insects infesting cereal commodities, P. R. Cornwell, L. J. Crook and J. O. Bull of the Atomic Energy Research Establishment at Harwell report.

Tests on 13 species of insects showed that radiation is effective in killing the insects, or inhibiting reproduction. The scientists found that sterility was caused in the insects but not death when low dosages of radiation were applied.

Science News Letter, April 13, 1957

IN SCIEN

PUBLIC HEALTH

Smoking Habits Worry Top Advertising Men

➤ ADVERTISING executives may sell cigarettes but they are far from convinced that the smoking habit is harmless.

From a survey of 1,100 top admen, *Tide* (March 22) reports more than half of the 662 admen who responded insisted there was either a "definite" or "possible" link between the habit and cancer.

But, like most consumers, this does not stop them from smoking.

The cancer problem has had an effect on the admen, though, for almost one out of three admitted that their smoking habits had changed in the past year.

About 80% had either cut down, stopped smoking completely or switched to filter tip cigarettes. Of the five top brands preferred by the advertisers, four are filter tips and are either new brands or those which have taken on a "new look."

"Clearly, the adman as a smoker is little different from the typical consumer when it comes to advertising susceptibility," *Tide* reports.

About the advertising pitch itself, one top agency executive said, "Now that it is 'pleasure' copy, I like it better than when it was scary or 'scientific'."

But the ad manager of a steel company was one of those who longed for the days of stronger cigarettes.

"I've smoked all the filters. Now I would like some good tobacco," he said.

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AERONAUTICS

British Rocket to Probe Stratosphere

➤ A BRITISH ROCKET designed to reach an altitude of 120 miles will soon be released at Woomera range in Australia.

Known as the Skylark, the rocket is 25 feet long and 17 and a half inches in diameter. It is powered by a Raven rocket motor, built by Bristol Aircraft in cooperation with the Royal Aircraft Establishment, which will give a thrust of 11,500 pounds for about half a minute.

The rocket flights will be used to determine atmospheric conditions at altitudes up to 120 miles. Strips of tin foil, or "window," will be dropped and tracked by radar to check wind strengths.

The Skylark is stabilized by three swept-back fins. Its flights will be made in connection with the International Geophysical Year, which runs for 18 months starting July 1.

Science News Letter, April 13, 1957

CE FIELDS

MEDICINE

Swelling in Knee, Sign Of Gangrene and Death

➤ A SWOLLEN BLOOD vessel in back of the knee that is often overlooked in routine physical examinations can bring on gangrene and death if not treated immediately, Dr. Jere W. Lord Jr., New York University Post-Graduate Medical School, reported in the *Journal of the American Medical Association* (March 30).

The blister-like swelling of the popliteal artery, called a popliteal aneurysm, is sly in its apparent harmlessness, but is a rather sinister warning of sudden catastrophe, Dr. Ford found.

The aneurysms are in a spot that is never seen by the patient and often missed by the physician but they can be easily spotted if they are being sought, he reports.

The aneurysms may develop during several diseases, but usually occur with hardening of the arteries and sometimes with bacterial or syphilitic infections.

In young people the artery is very adaptable and can be easily bent in a 45-degree angle when the leg is flexed, but with age the artery becomes rigid and less elastic. If it ruptures, it can cause gangrene of the leg or death.

Immediate surgery is called for if one of these aneurysms is found, even though it is causing no trouble at the moment, Dr. Lord cautions.

There are several operations that can be performed to remove the danger and their results are startlingly good if the surrounding tissue has not yet been affected.

Science News Letter, April 13, 1957

PHYSICS

Cosmic Rays Hold Much Of Energy in Universe

➤ MUCH of the energy of the universe is held by the cosmic rays continuously bombarding the earth from space, a New York University physicist has reported.

Dr. Serge A. Korff reported that the number and kinds of cosmic rays smashing into the earth's atmosphere are "remarkably constant" over a period of time. Occasional large increases are clearly associated with solar activity, he told the Society of the Sigma Xi meeting in Albuquerque, N. Mex.

A theory by the late Enrico Fermi, Dr. Korff said, appears to account for all that is now known about cosmic radiation. Dr. Fermi suggested that cosmic rays are accelerated in the magnetic fields of the giant pinwheels of billions of stars clustered in systems called galaxies. The Milky Way in which the earth, sun and solar system are located is only one among unnumbered millions of galaxies in the universe.

Dr. Fermi's suggestion explains why cosmic rays are mostly protons, which are the nuclei of hydrogen atoms, some alpha particles, which are the nuclei of helium atoms, and a few heavier nuclei. Each particle of the radiation, Dr. Korff said, has energy from a billion electron volts to a billion billion electron volts.

The energy density of cosmic rays is approximately equal to that of starlight, he reported, far above what could result from nuclear sources.

Science News Letter, April 13, 1957

RADIO

Mountains Improve Television Reception

➤ IF TV RECEPTION is bad in your area, maybe you need a mountain between the TV station and your set.

Mountains will improve reception rather than hinder it, R. E. Lacy, U. S. Signal Corps Engineering Laboratories, Fort Monmouth, N. J., reported to the Institute of Radio Engineers meeting in New York.

The phenomenon, known as "obstacle gain" was first noticed by GI's in Korea when they discovered that their very high frequency (VHF) radio reception showed an unaccountable improvement in mountainous areas, Mr. Lacy reported.

A series of tests conducted at 40 different locations in California verified the fact that sharp mountain peaks blocking the transmission path will actually strengthen the signals on the other side by as much as 100,000,000 times, he said.

A wide range of frequencies over 50 megacycles were tested. These are the ones used for VHF and UHF television as well as other communication services, he said.

These high frequency radio waves behave in a manner similar to light waves. They are bent toward the ground when they pass over the mountain ridges just as light rays are diffracted when passing by the edges of an opaque object, Mr. Lacy reported.

The tests have made it possible to compute the obstacle gain and take advantage of it when selecting locations for transmitting and receiving sites, he added.

Science News Letter, April 13, 1957

TECHNOLOGY

Cellophane Replaces Minerals in Microscope

➤ STACKS of strips of precisely dimensioned cellophane can be used to replace quartz or selenite (gypsum crystal) as a polarizing part of microscopes, a London scientist, S. N. Gaythorpe, has reported.

This device for rotating the polarization plane of light, important in scientific tests, is cheaper than the mineral variety.

Science News Letter, April 13, 1957

CHEMISTRY

Blended Whiskey Best for No "Morning After"

➤ A BLENDED WHISKEY is best if you want to avoid that "morning after" feeling, doctors learned from a scientific exhibit at the American Academy of General Practice meeting in St. Louis, Mo.

The exhibit, sponsored by a leading manufacturer of alcoholic beverages, points out the real hangover culprits may be ingredients called congeners. These congeners are what give each alcoholic beverage its distinctive flavor and bouquet. They include such compounds as ethyl acetate, acetaldehyde, tannin, acetic acid and fusel oil.

Moderate use of alcohol has certain medicinal advantages, the doctors were advised, but they should be sure to instruct their patients to select low congener types of beverage. None of the congeners themselves are at all beneficial. In fact, the only working ingredient is ethyl alcohol, the exhibit explained.

Independent chemical consultants analyzed various beverages and concluded that a blended whiskey was the best bet. Things to avoid are straight bourbon, bonded bourbon and cognac, they found.

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VIROLOGY

Boundary Gone Between The Living and Nonliving

➤ THE BOUNDARY LINE between the living and the nonliving has essentially disappeared now that the electron microscope has made viruses visible, Dr. Wendell M. Stanley, director of the virus laboratory of the University of California, reported in a paper published in the annual report of the Smithsonian Institution in Washington.

Filterable viruses, tiny agents of some of the most dreaded human, animal and plant diseases, now completely bridge the dimensional gap between life and inert matter, but as yet there appears to be no clear line of division between the two, he reported.

Some viruses are single molecules while others seem to consist of many molecules interacting in some special manner.

One of the most important recent discoveries concerning viruses is the change they can undergo from harmless organisms to deadly ones. Even with very mild or latent viruses, there is always a chance that they will become lethal due to some genetic change or mutation.

The solution of the virus problem undoubtedly carries the key to the nature of life itself, and possibly the key to the cancer problem, Dr. Stanley reported.

"Despite their small size, the viruses represent a potential source of information which may be far more important for mankind than the atom bomb or nuclear energy," he said.

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HORTICULTURE

Breeding Easter Lilies

New varieties of Easter lilies are being bred. These hybrids are being custom-tailored to suit the tastes and fancies of florist and flower-buyer. Tips for caring for this year's lilies.

See Front Cover

By HOWARD SIMONS

➤ AN EASTER ITEM receiving more attention, more careful handling, and more custom-tailoring than even the latest hat creation is the Easter lily.

Soon, hybrid varieties specially designed to suit the tastes and fancies of florists and flower-buyers will be ready for market. These plants will represent years of cross-breeding, experimentation and selection.

The flower designers responsible for these tailor-made plants are Government scientists at the Department of Agriculture's plant industry station in Beltsville, Md., a short drive from the nation's capital.

Here, in their greenhouse-laboratories, these plant scientists have produced Easter and garden lilies that are almost a florist's dream.

They have rid the Easter lily of danger from disease. They have learned to breed the plants to proper height and number of buds. They have created a domestic industry. And they have devised a method for controlling the blooming of any given Easter lily plant.

Testing 40 Varieties

More than 40 varieties of these new lily hybrids are now being tested and evaluated by Drs. Samuel L. Emsweller and Neil W. Stuart, the horticulturists mainly responsible for the lily industry in the United States. One of the hybrids is shown in the photograph on the cover of this week's SCIENCE NEWS LETTER.

Some of these lily hybrids will become available to flower-buyers through their florists this year, others in the years to come.

"Flowers," Dr. Emsweller pointed out, "change in fashion as much as women's clothes."

Two or three of the plants, for both home and church, will be named this year, Dr. Emsweller said. One will be a dwarf variety, another a tall plant and the third an "in-between."

They will be the offspring of plants that have been cultivated and cross-bred at Beltsville since the beginning of World War II. Prior to that time, every bulb forced or grown in the United States was imported, mainly from Japan. It was even generally believed lily bulbs could not be grown in the United States.

Work done at Beltsville shattered this belief and today virtually every Easter lily sold during the holiday season is a home-grown plant, born and bred in the United States.

It is interesting to note that Easter lilies are not just in demand at Easter, but are wanted all the year round. Statistically, more lilies are sold during the year than are sold at Easter time.

What are the qualities a florist looks for in an Easter lily plant? Dr. Emsweller smiled at this question and remarked, "Ten florists look for ten different qualities."

But, he explained, the Easter lily must have just the right number of buds—not too many and not too few. Three to five seems ideal. It must also be just the right height—not too tall or too short. This is especially true for the home plant. From 12 to 18 inches seems to do the trick.

In any event, breeding "just the right" Easter lilies is not an overnight task. It takes years and years. Some day, the Beltsville researchers hope, a plant known only as 48-50-33, will be introduced. It shows fine promise today.

The numeral designation illustrates the time element attendant with breeding. The first set of numbers, 48, means that the first hybrid plant of this variety was obtained in 1948. The second set, 50, means that seeds were obtained in 1950. The third set, 33, indicates that this plant is the 33rd seedling. It now grows in one of the Beltsville greenhouses, still undergoing tests and evaluation.

Perhaps one of the most fascinating and important developments to come out of the Easter lily experiments at Beltsville is the technique for keeping Easter lilies in storage and controlling the blossoming time.

Flowering Can Be Regulated

Because Easter lilies are in demand every day of the year, it is necessary to store and remove them from storage so that they will flower at the time of sale. Dr. Stuart has developed cold storage schedules that now make it possible for florists to flower Easter lilies at any specified time. In addition, Dr. Stuart has shown for the first time that it is possible to store Easter lilies at temperatures just below freezing and keep them in storage

LILY AND LILY-MAKER—One of the new hybrid Easter lilies that will soon be released for market is checked by Dr. Samuel L. Emsweller, Easter lily expert. Newer and better Easter lilies are part of Dr. Emsweller's research at the greenhouse-laboratories of the U. S. Department of Agriculture's plant industry station, Beltsville, Md.

without harm for as long as a full year.

Another important development has been the increase in the number of chromosomes in plant hybrids through the use of chemicals and irradiation. In this manner, tetraploids have been produced and today are the basis for the new lily hybrids.

If fashions change in plant tastes, the methods of plant research also change. The Beltsville Easter lily experimenters are currently working with atomic radiation and the newer growth regulators in their continuing attempt to produce better Easter lilies.

Easter lilies are tough plants. A potted lily can be kept fresh by watering it moderately so the soil is always moist. It needs as much light as possible, but this does not necessarily mean it must be kept in the south window.

The plant should stay in bloom for from ten days to two weeks and then can easily be transplanted to the garden.

When the plant has finished blossoming, set it out in the ground. It might bloom again in the fall. If it does not, it can be re-potted and brought into a greenhouse at Christmas time or left in the ground where it will come up again the following year—in the South by Easter time, and in the North by July or August.

Cut Easter lilies do not last very long. To keep them looking their best, the following is recommended:

As the flower opens, pinch off the part of the flower where the pollen is produced. This keeps the yellow pollen from sprinkling on the white flower. This can be done with thumb and forefinger or with a pincers.

It is not necessary to water the cut flowers or change the water. To keep their appearance good, remove the petals as they age. Easter lilies blossom from the lowest flower upwards.

One fact about Easter lilies that should remain unchanged is their color, which Dr. Emsweller says will stay white. There are from 80 to 90 varieties of lilies, including garden plants, Dr. Emsweller says, and they come in every color except blue.

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PEDIATRICS

Offer Oral Medicine For Diaper Rash

➤ A MEDICINE BABIES can take in their orange juice to cure diaper rash was shown doctors attending the American Academy of Pediatrics meeting in Washington.

The drug is called Pedameth and is marketed in measured amounts in a pink and blue capsule. The contents of the capsule are emptied into the baby's formula or juice to treat cases of diaper rash resulting from ammonia contained in the urine.

Pedameth, which contains dl-methionine, is 99% effective, claims its developer, S. F. Durst & Co., Inc., of Philadelphia, who report that it restores the body's nitrogen balance so the urine becomes ammonia-free.

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CHEMISTRY

Chemistry of Epilepsy

➤ EPILEPSY, a disease that affects 1,500,000 Americans, was linked to faulty chemistry in the brain by Dr. Donald B. Tower of the National Institute of Neurological Diseases and Blindness, National Institutes of Health in Bethesda, Md. He reported on its importance to an international group of epilepsy specialists meeting at the National Institutes of Health.

Since there is nothing consistent about the appearance of brain tissue giving rise to epileptic seizures, a biochemical basis for the disease is indicated, he said.

In the brain tissue of many epileptics, there is no observable difference between normal areas and those that give rise to seizures. In fact, in a great many cases, no pathological or diseased brain tissue can be found by observation, he added.

But changes have been found in the chemistry of the nerve cells in the suspected areas. The problem is whether these changes are a cause or an effect, he reported.

Three normal chemicals that are interfered with in some way are glutamic acid, acetylcholine and potassium.

Glutamic acid is an amino acid found in the body that makes possible many other chemical reactions in the brain. Acetylcholine is a chemical transmitter of nerve impulses, and the element potassium helps nerve cells conduct impulses along their fibers, he explained.

All of these substances are altered in epileptic brain tissue.

Partial proof of the biochemical basis of epilepsy has been given by the results of treatment with asparagine, a chemical that steps up the body's production of glutamic acid. In a small trial on patients at the National Institutes of Health the drug proved beneficial in reducing seizures although it did produce some bad side effects.

This type of treatment is far from being the final cure for epilepsy, but it does point to the fact that we are looking in the right direction, Dr. Tower said.

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ENGINEERING

Electronic Device to Help Polio Victims Breathe

➤ AN ELECTRONIC DEVICE that lets iron lung victims breathe for themselves instead of having their respiration forced by machinery was reported by Dr. L. H. Montgomery, Vanderbilt University School of Medicine, to the Institute of Radio Engineers meeting in New York.

The system, although still in the experimental stage, makes use of the few active chest muscles which continue to contract when the patient tries to breathe, Dr. Montgomery said. Even in the severest cases of paralysis, there are always a few of these active muscles left, he added.

When they do contract they are not strong enough to accomplish the breathing job, but they generate minute voltages which can be detected by sensitive electrodes placed on the skin. These voltages are fed to an electronic system which amplifies them and then uses them to control the flow of air to and from the iron lung or other respiratory device as the patient needs, Dr. Montgomery reported.

Aside from the greater comfort the system is a tremendous boost to patient morale. In presently used respirators the patient is compelled to eat, drink and even talk in rhythm with the monotonous push and pull of a motor driven air pump.

The electronic control now enables the patient to control his own breathing to suit himself.

The equipment is still in the experimental stage, Dr. Montgomery emphasized.

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Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

ANIMAL FRIENDS AND FOES—Osmond P. Breland—*Harper*, 259 p., illus. with drawings by Leo Hershfield, $3.95. Interesting and delightful facts about the animal kingdom.

ANTENNAS—Alexander Schure, Ed.—*Rider*, Electronics Technology Series, 79 p., illus., paper, $1.50. Fundamental concepts of antenna theory for electronics students and technicians.

AUTOMATION IN BUSINESS AND INDUSTRY—Eugene M. Grabbe, Ed.—*Wiley*, 611 p., illus., $10.00. Based on a series of lectures given at the University of California, this book includes discussion of the engineering and economic aspects of automation.

AUTOMATION: ITS PURPOSE & FUTURE—Magnus Pyke—*Philosophical Library*, 191 p., illus., $10.00. Describing the working of automation in diverse fields from food shopping and preparation to guided missiles.

BIOGRAPHICAL MEMOIRS, VOLUME XXX—Karl Patterson Schmidt and others—*Columbia University Press* for National Academy of Sciences, 409 p., illus., $5.00. Biographies, portraits and bibliographies of deceased members of the National Academy of Sciences.

CARNEGIE INSTITUTION OF WASHINGTON YEAR BOOK 1955-1956: With Administrative Reports Through December 14, 1956—Caryl P. Haskins, president—*Carnegie Institution*, 373 p., illus., paper $1.00, cloth $1.50. Reporting the research of the year by the Institution and its various departments.

THE CHEMICAL HISTORY OF A CANDLE—Michael Faraday, foreword by E. N. daC. Andrade and biographical introduction by Sir J. Arthur Thomson—*Crowell*, 158 p., illus., $2.75. These lectures were presented as one of the famous children's Christmas lectures at the Royal Institution in London in 1860.

EARLY CRETACEOUS MAMMALS AND THE EVOLUTION OF MAMMALIAN MOLAR TEETH—Bryan Patterson—*Chicago Natural History Museum*, Fieldiana: Geology, Volume 13, Number 1, 105 p., illus., paper, $2.25. Reporting evidence for the understanding of therian molar evolution.

ELEMENTS OF COLOR IN PROFESSIONAL MOTION PICTURES—Wilton R. Holm, Committee Chairman—*Society of Motion Picture and Television Engineers*, 104 p., illus., $3.50. Beautiful color photographs illustrate this basic treatise on color photography problems including those of the selection of subjects and effect of makeup.

ENERGY—Sir Oliver Lodge—*Rider*, rev. ed., 54 p., illus., paper, $1.25. The text has been modernized but an attempt has been made to retain the late author's fundamental presentation.

EXPECTANT MOTHERHOOD—Nicholson J. Eastman—*Little, Brown*, 3d rev. ed., 198 p., illus., $4.75. A professor of obstetrics presents this little book to serve as a reference source between the important regular prenatal visits to the doctor.

THE FUNDAMENTALS OF ELECTRIC LOG INTERPRETATION—M. R. J. Wyllie—*Academic*, 2d rev. ed., 176 p., illus., $4.50. Of particular interest to those concerned with drilling oil.

HELP YOUR HUSBANDS STAY ALIVE!—Hannah Lees—*Appleton-Century-Crofts*, 242 p., $3.75. The author is not a scientist or physician, but a woman convinced that American men are killing themselves to produce a better world for American women to live in alone.

HIGH-SPEED PHOTOGRAPHY: Proceedings of the Third International Congress—R. B. Collins, Ed.—*Academic*, 417 p., illus., $13.00. Reports are of new work not previously published.

INVESTIGATION OF VIRUS DISEASES OF BRASSICA CROPS—L. Broadbent—*Cambridge University Press*, 94 p., illus., $3.00. An account of the many factors affecting the incidence of brassica virus diseases, causing serious losses of cauliflower and broccoli, in Great Britain.

A MAN AGAINST INSANITY—Paul de Kruif—*Harcourt, Brace*, 246 p., $3.95. This new de Kruif book tells the story of a general practitioner's battle against mental illness, first in himself and then in the patients of a state hospital. The doctor believes that the answer lies in modern chemicals plus "tender loving care."

MEN OF MEDICINE—Katherine B. Shippen—*Viking*, 220 p., illus., with drawings by Anthony Ravielli, $3.50. Telling of physicians and their work from the days of the priest physicians of ancient Sumeria to the discovery of penicillin.

MINE ACID CONTROL—S. A. Braley—*Mellon Institute*, 2 p., illus., paper, free upon request direct to publisher, 4400 Fifth Ave., Pittsburgh 13, Pa. The discharge of acid water from coal mines is the most serious of all water-pollution problems. Remedy, the author believes, is in more frequent discharge of the water.

MODERN CHEMISTRY FOR THE ENGINEER AND SCIENTIST—G. Ross Robertson, Ed.—*McGraw-Hill*, 442 p., illus., $9.50. Lectures originally given as part of an extension course at the University of California. Each lecturer was selected as a recognized research scholar widely known as a contributor in his field.

MODERN METHODS OF MICROSCOPY: A Series of Papers Reprinted from "Research"—A. E. J. Vickers, Ed.—*Butterworth (Interscience)*, 114 p., illus., $3.50 plus postage. Dealing with most aspects of microscopy, including microscopic interferometry, electron microscopy and the flying spot microscope.

MY FAMILY AND OTHER ANIMALS—Gerald Durrell—*Viking*, 273 p., $3.95. The delightful story of a five-year sojourn of the naturalist-author and his family on the Greek island of Corfu.

NEARCTIC WASPS OF THE SUBFAMILIES PEPSINAE AND CEROPALINAE—Henry Townes—*Govt. Printing Office*, U. S. National Museum Bulletin 209, 286 p., illus., paper, $1.50. The species considered here occur in North America, north of Mexico.

PHYSIOGRAPHIC DIAGRAM OF THE UNITED STATES—A. K. Lobeck—*Geographical Press*, rev. ed., 8 p., maps, paper, 40 cents. The United States is here divided into 17 physiographic units, each of which is clearly described in its physical aspects.

THE PHYSIOLOGY OF REPRODUCTION IN FUNGI—Lilian E. Hawker—*Cambridge University Press*, Monographs in Experimental Biology No. 6, 128 p., $3.00. A knowledge of the factors inducing reproduction may often solve the problem of control of parasitic and other harmful fungi.

PLANT PROPAGATION IN PICTURES: How To Increase the Number of Plants in Your Home and Garden by Division, Grafting, Layering, Cuttings, Bulbs and Tubers, Sowing Seeds and Spores—Montague Free—*American Garden Guild* and *Doubleday*, 250 p., illus., $4.95. Excellent photographs illustrate the procedures step by step.

PRACTICAL APPLICATIONS OF ENGINEERING SOIL MAPS—William W. Holman, Robert K. McCormack, James P. Minard and Alfreds R. Jumikis—*Rutgers University Press*, Engineering Research Bulletin Number 36, 114 p., illus., $3.00. Highway planning, regional planning, agricultural land use and geology are some of the fields in which these maps can be used.

PSYCHOLOGY YOU CAN USE—Dorothy Hazeltine Yates—*Crowell*, 248 p., $3.95. A psychologist presents the findings of this science in a form that you can use in daily life. She explains, for example, the kind of mental "set" that would help a motorist avoid accidents.

THE RACE QUESTION IN MODERN SCIENCE—Juan Comas, Otto Klineberg and others—*UNESCO and Whiteside (Morrow)*, 373 p., $5.00. As weapon in its battle against racial prejudice, UNSECO asked leading anthropologists and psychologists to prepare these nine monographs on various aspects of race.

THE UNIVERSE AND DR. EINSTEIN—Lincoln Barnett with a foreword by Albert Einstein—*William Sloane Associates*, 2d rev. ed., 127 p., illus., $3.50. This little book has been brought up to date with the inclusion of the most recent discoveries in atomic physics.

THE WATER RELATIONS OF TERRESTRIAL ARTHROPODS—E. B. Edney—*Cambridge University Press*, Cambridge Monographs in Experimental Biology No. 5, 109 p., illus., $3.00. Discussing the physiology of water balance of these creatures, particularly insects.

WAVE PROPAGATION—Alexander Schure, Ed.—*Rider*, Electronic Technology Series 11, 56 p., illus., paper, $1.25. Providing technicians, amateurs and students with understanding of the basic principles of wave propagation.

WE CALL THEM CRIMINALS—Ralph S. Banay—*Appleton-Century-Crofts*, 291 p., $3.95. The prison, as now constituted, the author declares, must go. The philosophy from which it sprang is obsolete, its basic concept is erroneous, its physical plant an abomination, and its personnel are usually inadequately trained and politically controlled. The author is former director of the psychiatric clinic at Sing Sing.

WHEN DOCTORS MEET REPORTERS: A Frank Discussion by Science Writers and Physicians of the Controversy Between the Press and the Medical Profession—Compiled by Hillier Krieghbaum—*New York University Press* for the Josiah Macy Jr. Foundation, 119 p., paper, $2.50. Relating the high points of discussion at a series of conferences sponsored by the Josiah Macy Jr. Foundation.

Science News Letter, April 13, 1957

A lightweight *brick aggregate*, light enough to float in water, lowers freight costs and may bring brick construction in competition with frame.

Crease-resistance that permits cotton wearing apparel to be laundered and worn without ironing can be imparted to the fabric by resin treatment.

The clothes *moth grub* is so small that it can pass through a hole 1/25th of an inch in diameter.

GERIATRICS

America Is Backward in Caring for Oldsters

➤ AMERICA is a backward country when it comes to providing a stimulating social environment for people who retire at 65, Dr. Benjamin Boshes, Northwestern University Medical School, told the annual clinical conference of the Chicago Medical Society meeting in Chicago.

"Too few men have the ability for full-time recreation. They do not know how to play. They are much better equipped to work. When their occupation, which is actually their recreation, is taken away from them, they are literally lost," he said.

Enforced retirement frequently brings a loss of direction and motivation, and may cause disturbances which are in no way related to the actual physical aging of the body, Dr. Boshes reported.

"The outcome is considerable deterioration of personality, frequently a depressive reaction, and with it a tremendous acceleration in the aging process," he said.

What appears to be a "dementing process" in an older man or woman is frequently a mental reaction which disconnects the person from reality. There is a loss of attention and interest and the individuals are unable to work out a new pursuit for themselves.

But careful evaluation shows little organic loss and, with proper care, the person can be often brought back into reality, he reported.

Science News Letter, April 13, 1957

METEOROLOGY

Picture How Hurricane Continues to Swirl

➤ A PICTURE of how a hurricane obtains its energy to keep swirling has been drawn mathematically, the American Meteorological Society was told at its meeting in Chicago.

The model devised by Dr. Jule Charney, Massachusetts Institute of Technology, Cambridge, Mass., has winds with velocities increasing toward the center but relatively quiet in the storm's eye, as they are in real hurricanes. These winds have speeds up to 100 miles an hour both in reality and when calculated using Dr. Charney's mathematical formula.

His model also accounts for the warm temperatures found in the hurricane's center, Dr. Norman Phillips, also of Massachusetts Institute of Technology, reported. He presented Dr. Charney's results at the meeting.

Source of the energy driving a hurricane is the heat of condensation of rising air. This heat is removed by friction with the earth's surface and by turbulence within the storm. The addition and removal of heat, as well as the motions and velocities of the hurricane, are all related to each other, Dr. Charney's study showed.

Science News Letter, April 13, 1957

PSYCHOLOGY

Child, Adult Addictions

➤ CHILDREN who eat lead-containing paint and other substance do so for some of the same reasons that cause adults to become alcohol or narcotic addicts, Dr. Frances Millican, department of psychiatry at Children's Hospital, Washington, D. C., reported to the American Academy of Pediatrics meeting in the nation's capital.

She studied 31 children with bizarre appetites for inedible substances, a habit known medically as pica.

Pica takes on many forms, of which lead poisoning is only one example, Dr. Millican said. Merely keeping the child away from lead-containing paints and other substances is not completely effective. It does not get at the underlying reason of why the child shows this type of behavior. Children who are stopped forcibly from eating harmful substances may develop other symptoms such as skin eruptions.

Commenting on the research, Dr. Reginald Lourie, chief of the hospital's psychiatry department, which carried on the study, said that the main problem with pica children can be traced to the mother-child relationship.

Passive and dependent mothers and those who cannot deny their child anything are frequently responsible, he reported.

Pica is not necessarily the same addiction that is seen in adults but it has many of the same elements. Studies of adult addicts always showed that the roots of the problem are in childhood, he said.

The study will be expanded to learn exactly how childhood pica and adult addiction are related, Dr. Lourie reported. He hopes to enlist the aid of outside agencies to study the history of adult addicts and see if they showed signs of pica during childhood.

Associated with Drs. Millican and Lourie in the research were Drs. Emma Layman and Barbara Sokoloff, and Lilly Y. Takahashi.

Science News Letter, April 13, 1957

MEDICINE

Sex Views Blamed For Early Pregnancies

➤ OUR DISTORTED sex perspective should be corrected by parents, citizens and physicians, Dr. Goodrich C. Schauffler, a Portland, Ore., gynecologist, reported to physicians attending the American Academy of General Practice meeting in St. Louis, Mo.

Today's young girls, as a group, are deeply confused and disturbed. They suddenly find themselves facing the whole tree of sex knowledge without having first been exposed to the tips of the roots, he said.

As a result they climb the tree of knowledge eagerly, but they cannot distinguish the rotten branches, Dr. Schauffler added.

The purely obstetrical outlook of a 13-year-old girl is good. The other aspects of what Dr. Schauffler termed "precocious pregnancies" are not, he said. Children of that age are not intellectually or socially conditioned to childbearing or child care. With rare exceptions, the total picture too often ranges from pathetic to tragic, he reported.

Delinquent parents or educators are not entirely responsible for the situation. Instead, it is the result of the current and almost insane sex preoccupation, he added.

The gynecologist urged early, frequent, and thorough examinations by physicians, and every effort to maintain a physically and psychologically healthy status.

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Questions

BACTERIOLOGY—What kind of bacteria produce colominic acid? p. 230.

□ □ □

CHEMISTRY—What is the name given the new group of metal and vinyl compounds? p. 230.

□ □ □

GEOPHYSICS—What are the four different coatings that will go over the gold plating of the proposed earth satellites? p. 226.

□ □ □

HORTICULTURE—How long will Easter lilies stay in bloom? p. 234.

□ □ □

PHYSICS—What is the name of the machine the AEC plans to build to conduct research in thermonuclear reactions? p. 227.

□ □ □

PSYCHOLOGY—What is one of the strange substances children sometimes eat? p. 238.

□ □ □

TECHNOLOGY—What everyday substance can now be used to replace quartz as a light polarizing part of microscopes? p. 233.

□ □ □

Photographs: Cover and p. 234, Fremont Davis; pp. 227 and 228, Los Alamos Scientific Laboratory; p. 229, British Information Services; p. 231, Civil Aeronautics Administration; p. 240, Bakelite Company.

BIOLOGY

Baboons Join Fight Against Heart Disease

➤ THE MONKEY is getting a new partner to share his job in scientific research, his "big brother" the baboon.

The arrival of the first six baboons for a proposed colony of 300 of the large animals was reported by the Southwest Foundation for Research and Education, San Antonio, Tex. They will be used for studies on heart disease and will be made available to other research institutions.

The importance of baboons for heart research was indicated by the recent discovery that a baboon in the New Orleans zoo had died with a condition resembling hardening of the arteries in humans. This is the first animal that "naturally" developed the disease, the foundation reported.

Science News Letter, April 13, 1957

ENTOMOLOGY

World Flies Resist DDT

➤ DDT-RESISTANT HOUSE FLIES can now be found throughout the world, Dr. Ralph E. Heal, executive secretary of the National Pest Control Association, reported at the Association's meeting in Elizabeth, N. J.

Other insects menacing man's health are also developing strains that literally thrive on DDT and other chlorinated hydrocarbons, Dr. Heal warned.

"Almost all of the medically important pests now have shown resistance to one or more of the insecticides heretofore effective against them," he said. "The problem is world-wide in its scope and of serious concern to all who are responsible for the health of animals and man."

Calling the insecticide-resistant pests "super" insects, Dr. Heal pointed out that new strains of flies, cockroaches, fleas, bedbugs and ticks have tossed "a new challenge at science and the pest control industry."

For some reason not fully explained, he said, certain individuals among a group of insects survive treatment by a given insecticide. A chemical process makes the poison harmless to that individual and his progeny. From these individuals, a whole new strain of insect appears.

Dr. Heal said that the first case of DDT-resistant flies was spotted in a Swiss scientist's laboratory in 1947. Since then, the fly has been found to be resistant to DDT and similar chlorinated hydrocarbons the world over. The German cockroach resists DDT and chlordane, and cat and dog fleas resist DDT. Bedbugs are now becoming resistant, and the brown dog tick is the newest resistant insect to be reported.

The battle between man and insect continues. Where DDT has failed malathion has worked, Dr. Heal said, but scientists fear that soon insects will develop a resistance to malathion and newer insecticides, just as they have to DDT.

Science News Letter, April 13, 1957

AERONAUTICS

Build Gander Radio Link

➤ CANADA will build a "forward scatter" radio station near Gander Airport, Newfoundland, to help speed air traffic across the North Atlantic.

Part of a chain to improve communications in this region, it will cost $650,000, the International Civil Aviation Organization reports. Canada may also jointly finance other stations in Iceland and Greenland with countries whose aircraft fly the North Atlantic.

The network is aimed at providing one direct voice channel and four teletypewriter channels between Gander, Greenland, Iceland, Scotland and Ireland.

"Forward scatter" uses high-powered transmitters working in the very high frequency radio band. A small portion of the signals from especially designed antennas are scattered by an ionized layer of air about 55 miles above the earth and picked up by ground receiving stations considerably beyond the horizon.

This communications method is being used because existing high frequency radio teletype circuits are subject to frequent radio blackouts due to ionospheric disturbances.

Recommendation for the new chain resulted from the prediction that development of air traffic in the North Atlantic will be more and more handicapped as traffic increases, unless collective action is taken by all governments whose airlines fly the Atlantic. This prediction was made by the jet age task force of the International Civil Aviation Organization, a specialized agency of the United Nations.

The task force found that, in the summer of 1956, more than half the flights across the North Atlantic suffered substantial difficulties originating in communications or air traffic control services.

Using the forward scatter network is expected to alleviate this situation at least partially.

Science News Letter, April 13, 1957

EDUCATION

Medical Schools Create Oversupply of Specialists

➤ THE NATION'S MEDICAL SCHOOLS are not giving adequate training in general medical practice and have helped create an oversupply of specialists, Dr. Malcom E. Phelps of El Reno, Okla., newly elected president of the American Academy of General Practice, told members of the Academy meeting in St. Louis.

A man can be a trained specialist but, at the same time, an inadequately trained general practitioner, Dr. Phelps reported.

The concentration of specialists in the more populated areas has resulted in an intense competition for patients. Because of it, many specialists have been forced for economic reasons to enter general practice, he pointed out.

Unless the country's family doctors take an active part in shaping professional policy, "selfish and unscrupulous persons may soon further deny them the opportunity of performing many services for which they are adequately trained," he said.

Science News Letter, April 13, 1957

Do You Know?

It is now possible to withdraw whole *blood* from a donor and simultaneously separate the red blood cells and plasma and return the red cells to the donor.

Pyrethrum is a daisy-like flower that yields a natural insecticide.

The *U. S. population* has grown by 100,000,000 since 1895.

Cows "short changed" on protein in their diets may be in danger of falling ill with ketosis which will cut milk output seriously.

Horizontal and vertical movements of the *ocean water* masses influence the climate of our world.

The Jackpile Mine in New Mexico, which is estimated to contain at least 15,000,000 tons, is the largest single *uranium deposit* in the United States.

Weathervision, the use of industrial TV techniques to allow one forecaster to service a number of customers simultaneously, is now operating.

Two large eggs provide about the same amount and quality of *protein* as an average serving of meat.

• New Machines and Gadgets •

For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE SERVICE, 1719 N St., N.W., Washington 6, D. C., and ask for Gadget Bulletin 878. To receive this Gadget Bulletin without special request each week, remit $1.50 for one year's subscription.

BASKETBALL NET for junior has a rim and netting made of a plastic. The netting stays white and will not stretch, peel or crack. It can be used outdoors, as well as indoors.

Science News Letter, April 13, 1957

OIL TESTING KIT detects solids, corrosive acids and fuel dilution in lubricating oils. Designed for use by nontechnical persons, the tester can determine in a matter of minutes whether the oil being tested needs changing or is unsatisfactory. The kit is available in a metal equipment case.

Science News Letter, April 13, 1957

SPLICE COVERING is a two-piece fitting that provides moisture-proof protection for electrical wire repairs. Molded of a polyethylene resin, the splice cover is designed in two tubular sections which slide together end-to-end to form an overlapping seal. A standard cover can be used for wire sizes from #6 to #2.

Science News Letter, April 13, 1957

FLYABLE SCALE MODEL of Lindbergh's "Spirit of St. Louis" is made of a high-impact styrene plastic. The monoplane model can be assembled from a kit containing 34 parts, pre-formed to scale of one-half inch to one foot. The assembled

plane is 11 and one-half inches long and has a wing span of 18 inches, as shown in the photograph. It is powered by a rubber band.

Science News Letter, April 13, 1957

FOUNTAIN BRUSH for washing buses, trailer-trucks or large vans cleans a 15-inch swath in one stroke. A swivel attachment permits adjustment of the brush head to any angle. The aluminum handle is designed to be hooked up to a hose. The brush is available with four- or six-foot handles.

Science News Letter, April 13, 1957

OFFICE ACCESSORIES made of aluminum simplify and speed up filing, collating and identifying papers. The lightweight aids are a gathering rack that expands like an accordion, a wall rack that holds up to 40 pounds, and a finger-tip desk file that takes material of different thicknesses.

Science News Letter, April 13, 1957

PLASTIC "LINENS" for everyday use are produced from a film made from a polyethylene plastic. Embossed and inlay-printed, the draperies and tablecloths can be cleaned with a damp cloth. The plastic materials have raised patterns to look like rich brocade or fine damask.

Science News Letter, April 13, 1957

BOARDING RAMP for boats has six steps that are said to remain horizontal at all times, high tide or low. The aluminum steps have stainless steel fittings and are anodized to resist pitting and corrosion. Five and one-half feet long, the boarding ramp weighs 42 pounds. A movable handrail fits either side of the ramp.

Science News Letter, April 13, 1957

Nature Ramblings

By HORACE LOFTIN

➤ IT IS SPRINGTIME now over much of the nation, and the woodland plants are in flower there. Among these plants are the pine trees. But who among us has seen the "blossom" of a pine tree?

Why, all of us have seen the pine's flowers — the cones of the pine are the equivalent of the blossoms of the more familiar "flowering plants," such as the dogwood or the rose.

Each cone is composed of a short central axis which bears small, loosely-fitting scales. The scales are structurally the leaves, and the central axis is a branch of a stem. Thus, it has the fundamental structure of a flower. Likewise, the cone is functionally a flower, for it gives rise to seeds and hence to new pines.

There are two kinds of cones in every pine. One of these is rather long and narrow, and gives rise to the pollen or

Flower of the Pines

male element. The other is usually shorter and stouter and contains the ova or eggs of the pine tree.

The "male" cones commonly grow in a cluster near the base of a vegetative bud. The "female" cones are usually borne singly or in a small cluster at the tip of a young stem.

If you find a pine tree with its "male" cones a bright yellow this spring, shake the limb and a veritable cloud of pollen will fall around you. The pollen grains are very small and have two wing-like structures on them, allowing the wind to scatter them far and wide. Some of these pollen grains fall between the scales of "female" cones, where the unfertilized eggs are found.

The entire cycle of reproduction of a typical pine takes from three to four years to complete. Here is what happens in the white pine, *Pinus strobus:*

In the first spring, the two kinds of cones appear. Pollen is formed in the "male" cone and pollen grains are transported through the air to a "female" cone. That summer, a tube that grows toward the egg but does not reach it develops from the pollen grain. Only in the following spring is the egg fertilized as the pollen tube reaches it.

During the second summer the seed matures and falls to the ground. The following spring—the third of the cycle—the seed germinates to give a new pine plant.

Science News Letter, April 13, 1957